

## Original Research Article

# Clinical and aetiological study of chronic lower limb ulcers

Shrikant B. Kuntoji, Pavan Kumar Guduru\*

Department of General Surgery, S. Nijalingappa Medical College and HSK hospital, Bagalkot, Karnataka, India

**Received:** 17 March 2021

**Revised:** 18 May 2021

**Accepted:** 19 May 2021

**\*Correspondence:**

Dr. Pavan Kumar Guduru,

E-mail: [guduru.satyapavan@gmail.com](mailto:guduru.satyapavan@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Chronic ulceration of the lower leg is a frequent condition, with a prevalence in the population over 60 years of age. The incidence of ulceration is rising as a result of the ageing population and increased risk factors for atherosclerotic occlusion such as smoking, obesity and diabetes. Ulcers can be defined as wounds with a ‘full thickness depth’ and a ‘slow healing tendency’. In general, the slow healing tendency is not simply explained by depth and size, but caused by an underlying pathogenetic factor that needs to be removed to induce healing. The main causes are venous valve insufficiency, lower extremity arterial disease and diabetes, less frequent conditions are infection, vasculitis, skin malignancies and ulcerating skin diseases such as pyoderma gangrenosum. For a proper treatment of patients with leg ulcers it is important to be aware of the large differential diagnosis of leg ulceration and to effectively manage the conditions.

**Methods:** Prospective study of 80 cases of chronic lower limb ulcers admitted at S. Nijalingappa medical college and HSK hospital and research centre, Bagalkot during the period January 2019 to June 2020, with regular dressings, debridement, skin grafting's, amputations, treating underlying systemic diseases were done.

**Results:** In a study of 80 cases, most of the patients with lower limb ulcers had an underlying systemic disease like diabetes, vascular insufficiency both arterial and venous.

**Conclusions:** In a prospective study of 80 patients having chronic lower limb ulcers the commonest ulcer was diabetic foot ulcers followed by arterial/ischemic ulcers. The highest incidence is seen in sixth decade of life with male predominance.

**Keywords:** Chronic non-healing ulcer, Diabetic leg and foot ulcer, Varicose ulcer, Tropic ulcer, Arterial ulcer, Traumatic ulcer

### INTRODUCTION

Chronic leg ulcer also known as chronic lower limb ulcer is a chronic wound of the leg that shows no tendency to heal after 3 months of appropriate treatment or is still not fully healed at 12 months.<sup>1</sup> The incidence of ulceration is rising as a result of the aging population and increased risk factors for atherosclerotic occlusion such as smoking, obesity, and diabetes. Ulcers can be defined as wounds with a “full thickness depth” and a “slow healing tendency”. Ulcers of skin can result in complete loss of epidermis and often portions of the dermis and even subcutaneous fat.<sup>2</sup>

Lower extremity ulcer is most common in our population due to their chronicity. This problem affects adults, who are in their prime working age, not only from lower and middle strata but also from upper class. At many places lower extremity ulcer is considered unimportant of all the disease and its management is usually done by the most junior in unit.

According to Callam et al study Venous ulcers or stasis ulcer account for 76% of the lower extremity ulceration.<sup>11</sup> Less common aetiologies for lower extremities ulcer includes arterial insufficiency, prolonged pressure, diabetic neuropathy and systemic illness such as

rheumatoid arthritis, vasculitis, osteomyelitis and skin malignancies.<sup>4</sup>

As lower extremities are exposed to injury and having a circulation strained by upright posture of human being should be the site of ulcer. This has the reason for researchers and surgeons who have been concerned with the reasons for their common occurrence and difficulty in their cure.

It has been reported that ulcers related to venous insufficiency constitute 70%, arterial disease 10% and ulcers of mixed aetiology 15% of leg ulcer presentations.<sup>5</sup> The remaining 5% of leg ulcers result from less common pathophysiological causes and this latter group comprise considerable challenges in diagnosis, assessment and management.<sup>5,6</sup>

## **METHODS**

### ***Place of study***

The material for this study was drawn from the patients admitted to the surgical department, S. Nijalingappa medical college and HSK hospital and research centre, Bagalkot.

### ***Study design***

The study design used for current study was case series study.

### ***Statistical method***

Data will be entered in Microsoft excel and later analysed using SPSS software version 19. Chi-square test and student 't' test will be applied for qualitative and quantitative data respectively other appropriate statistical tests will be applied  $p < 0.05$  is considered as statistically significant.

### ***Ethical approval***

Approval has been taken from institutional ethical committee.

### ***Study period***

Study period for the study was 18 months (December 2018 to June 2020).

### ***Study population***

A total number of 80 cases were considered for the study. This group was a diversified one and included patients of both sexes and all ages above 18 years and above, all religion and economic strata. This study included cases of stasis ulcers, diabetics with leg ulcers, traumatic ulcers, arterial ulcers and others.

A detailed history was collected with particular reference to onset, duration and type of lesion, and systemic diseases.

A thorough systemic and local examination was carried out. The morphological features of ulcers i.e., number, distribution of the ulcer on leg or foot site and associated diseases like varicose veins, eczema or patches were noted.

But while presenting only relevant positive and some important negative findings were shown to make the study brief and to avoid unnecessary repetitions.

### ***Sample size calculation***

By open epi software version 2.

Formulae we got is sample size  $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p*(1-p)]$ ,

$n = 78$ .

### ***Inclusion criteria***

Inclusion criteria included all the patients attending SNMC and HSK hospital OPD and emergency who were diagnosed clinically as chronic lower limb ulcers with age  $> 18$  years, patients who are willing to participate in the study and follow-up and all traumatic ulcers not healing even after 3 months.

### ***Exclusion criteria***

Exclusion criteria for the current study excluded patients with chronic lower limb ulcers with age  $< 18$  years, Patients with chronic lower limb ulcers with underlying skin malignancies, acute traumatic ulcers and post debridement ulcers.

## **RESULTS**

In our study the males were the predominant having chronic lower limb ulcers about 70 patients (87.5%), and female patients were 10 (12.5%). However, in other studies there has been no gross difference between male/female ratio.

Incidence of leg ulcers in this study group were found to be maximum in the age group of 50 and above. Age below 18 years were not included in the study.

All types of ulcers have more incidence in the age group of 60-69 years, among which diabetic foot ulcer has the highest incidence in this age group.

Among the 80 cases studied the commonest was found to be diabetic ulcer accounting for 32 (40%) cases followed by arterial ulcer 19 (23.8%), traumatic ulcer 08 (10%),

trophic ulcer 01 (1.3%), venous ulcer 09 (11.3%), non-specific 11 (13.8%).

**Table 1: Etiology of various types of chronic lower limb ulcers.**

Diagnosis	Male	Female	Total
Arterial/ischemic ulcer	15	4	19
Diabetic ulcer	30	2	32
Traumatic ulcer	7	1	8
Trophic ulcer	1	0	1
Venous ulcer	8	1	9
Non specific	9	2	11
<b>Total</b>	<b>70</b>	<b>10</b>	<b>80</b>

Chi square test, P>0.05, Not sig

According to Gilliland et al 95% of leg ulcers are due to vascular aetiology and venous ulcers dominates accounting for up 90% of the cases.<sup>9</sup> Arterial ulcers account for 5 and 10% and others are due to neuropathy or a combination of both, Young.<sup>7</sup>

In our study patients having various comorbidities are anaemia in 18 patients (22.5%), atherosclerosis in 19 (23.5%) patients, diabetes in 36 (45%) patients, hypertension (HTN) in 26 (32.5%) patients, and varicose veins in 9 (11.3%) patient's, other comorbidities are hypothyroidism in one patient, cirrhosis of liver in one patient, chronic kidney disease in 2 patients.

In arterial/ischemic ulcers patients two patients had TAO (Thrombo angiitis obliterans), one patient has osteomyelitis of the talus bone for which below knee amputation was done, and one patient had polyneuropathy.

**Table 2: Types of organisms isolated from the discharge of the ulcer.**

Organisms isolated from ulcers	No. of cases	Percent (%)
<i>Klebsiella</i>	2	5
<i>E-coli</i>	4	10
<i>Pseudomonas</i>	4	10
<i>Staphylococcus</i>	20	50
<i>Streptococcus</i>	10	25

In our study *Staphylococcus* was the most common organism that was isolated in the culture from the ulcer which is 50%, second common was the *Streptococcus* which was 25%, and *Klebsiella* is the least common organism.

In our study total 33.8% underwent surgical intervention like surgical debridement in 5 (19.2%), amputations in 5 (19.2%) among them 2 patients underwent below knee amputation, 3 underwent forefoot amputation, SSG (split thickness skin grafting) in 6 (21.1%), varicose veins surgery (flush ligation of saphenofemoral junction and

subfascial ligation of perforators) in 7 (26.9%), perforator ligation in 2 (7.7%), and vascular surgery in 2 (7.7%) where revascularisation surgery by bypass vascular graft for femoral artery block. And the rest 67.5% underwent conservative line of management.

**Table 3: Various treatment modalities of the patients.**

Treatment	No. of cases	Percent (%)
<b>Surgical</b>	27	33.8
<b>Non-surgical</b>	54	66.2
<b>Total</b>	<b>80</b>	<b>100</b>
<b>Surgical</b>		
Debridement	5	19.2
Amputation	5	19.2
Perforator ligation	2	7.7
SSG	6	21.1
Varicose vein surgery	7	26.9
Vascular surgery	2	7.7
<b>Total</b>	<b>27</b>	<b>100.0</b>
<b>Non-surgical</b>		
Anaemia correction with dressings	5	10.6
Dressing	48	89.4
<b>Total</b>	<b>53</b>	<b>100</b>

Various types of dressings done regularly, along with proper diet plan and good glycaemic control was achieved in diabetic patients. appropriate antibiotics were given and infection was controlled. some patients had negative pressure dressing. Associated comorbid conditions like hypertension, atherosclerosis, anaemia and hypoproteinaemia and malnutrition were addressed properly and treated accordingly.

## DISCUSSION

The prevalence of leg ulcers is probably between 0.18% and 1% (Phillips, Tania et al)<sup>8</sup> 95% of leg ulcers are due to vascular aetiology, Gilliland et al and among all chronic wounds lower extremity venous ulcer dominates the differential diagnosis accounting for up to 90% of the cases Burton et al and Callum et al.<sup>9,11</sup> Arterial diseases account for 5% to 10%, most others are due to neuropathy or a combination of both by Yound.<sup>7</sup>

In this study chronic ulcer with vascular aetiology accounted for only 35.1% of all types of ulcers. Out of these varicose veins are 11.3%, and arterial ulcers are 23.8%. chronic ulcers associated with diabetes accounts for 40%. Traumatic ulcers accounts for 10.0%. and nonspecific ulcers are 18.8%.

As observed above the present study was not comparable with the published studies mentioned probably because of following reasons:

The study group of 80 patients was too small a number to draw any comparative.

The other published studies were population based, controlled randomized or a group-based study which includes different specialities whereas this study was a non-randomized and uncontrolled study.

Some investigators have classified diabetic ulcers as metabolic. The most important factors responsible for causation of ulcer in diabetes are the arterio-sclerotic lesions in large leg arteries and or neuropathy resulting in decreased sensation. If diabetic ulcers in our study are considered vascular disorders rather than metabolic, the percentage of vascular ulcers in our study is about 75.1%-somewhat comparable to the above study. However, this is controversial and in diabetes it is a combination of factors that are to be considered in causation of leg ulcers.

Also, according to Callam et al, the distribution of different types of ulcers were 76% for varicose veins ulcer, 22% arterial insufficiency, 9% had rheumatoid arthritis, and only 5% had diabetes.<sup>11</sup>

As per studies done by Forssgren et al, venous ulcer counts for about 78 (32%), mixed venous and arterial is 16 (13%), mixed arterial and venous is 14 (6%), arterial 9 (4%), arterial and diabetes 27 (11%), diabetic 20 (8%), traumatic 3 (1%), pressure 10 (4%).<sup>12</sup>

In the present study, ulcers had the same site of distribution i.e., ulcers in the gaiter zone were mostly caused by venous insufficiency and ulcers in the foot below the line of shoes were mostly caused by arterial insufficiency and or diabetes.

About 70% of the patients in our study had ulcers in the foot only. This is rather high figure in comparison to Hansson's study which shows about 30% of the ulcers in the foot. This is probably due to a greater number of diabetic and arterial ulcers in our study.

The mean age in our study was 59 years and minimum age was 20 and maximum was 95, according to Anil Kumar S, Binitha M P et al<sup>13</sup> the mean age was 60.36 years which is almost similar. And in another study by Forssgren et al, 79% were older than 64 years and only 5% were younger than 50 years.<sup>12</sup>

In our study maximum number of cases were seen in 60-69 years of age the maximum number were diabetic ulcers followed by arterial insufficiency, but in our study the venous and arterial ulcers were seen in younger age group, 40-49 years in case of venous ulcers where the working population is more and in case of arterial ulcers starts at younger age and as age increases the cases increases. But according to study done by Callam et al.<sup>11</sup> the elderly is not the only population at risk: In his study ulceration began before the age of 40 years in 22% of the population studied.

In our study, males were 87.5% and females were 12.5% which is much less than compared to other study by Forssgren et al, which is male were 41%, and female were 59%.<sup>12</sup> And in Kumar et al study where males were 58%, and females were 42%.<sup>13</sup>

Surgery was the main treatment for the patients with varicose veins ulcers were flush ligation of the saphenofemoral junction and subfascial ligation of the incompetent perforators in 26.9% and only perforator ligation in 7.7%. and patients having healing ulcer and no any growth from the ulcer underwent split thickness skin grafting who were healed on average of 10 days. Only 5 patients (19.2%) underwent amputations 2 had below knee amputation, 3 had forefoot amputation who having diabetic foot ulcer with infection and wet gangrene. Rest of the patients were treated conservatively by regular dressings.

A study of recurrences of venous ulcers could not be made due to inadequate time follow up.

Appropriate anti-diabetic therapy includes insulin, antibiotics, the debridement and regular dressings were the important methods of treatment for diabetic ulcers in our study.

### **Limitations**

There was limited sample size in this study. Follow up of the patients was also limited.

### **CONCLUSION**

The highest age incidence of leg and foot ulcers in this study was in the age group of 60 years and above 48 patients (60%). The mean age was 59.0 years and standard deviation is 13.6. There was marked male predominance of 87.5%. 75% of venous ulcer were situated in the gaiter zone. 85% of the diabetic ulcers were situated on the foot. 100% of the arterial ulcers were situated on foot. *Staphylococcus* was found to be most common pathogen to be isolated from the ulcer i.e., 50%. 5 patients underwent amputations as lifesaving procedures. Most of the patients with varicose veins underwent flush ligation of the saphenofemoral junction and subfascial ligation of the incompetent perforators and some underwent only subfascial ligation of the incompetent perforators. Total 6 patients had split thickness skin grafting.

### **ACKNOWLEDGEMENTS**

Author would like to thanks to the HOD and the senior professors in the department of general surgery S Nijalingappa medical college and my colleagues who helped me in completing this study. Also, thank my friends and family who helped and supported me during this study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Kahle B, Hermanns J, Gallenkemper G. Evidencebased treatment of chronic leg ulcers. *Deutsches Arzteblatt Int.* 2011;108(14):231-7.
2. Van Gent WB, Wilschut ED, Wittens C. Management of venous ulcer disease. *Brit Med J.* 2010;341(7782):1092-6.
3. O'Meara S, Al-Kurdi D, Ovington LG. Antibiotics and antiseptics for venous leg ulcers. *Cochrane Database Syst Rev.* 2008;(1):CD003557.
4. De Araujo T, Valencia I, Federman DG, Kirsner RS. Managing the patient with venous ulcers. *Ann Intern Med.* 2003;138(4):326-34.
5. Casey G. Causes and management of leg and foot ulcers. *Nurs Stand.* 2004;18(45):57-8.
6. Gottrup F, Karlsmark T. Leg ulcers: Uncommon presentations. *Clin Dermatol.* 2005;23(6):601-11.
7. Young JR. Differential diagnosis of leg ulcers. *Cardiovasc Clin.* 1983;13(2):171-93.
8. Tania P, Stanton B, Provan A, Lew R. A Study of the Impact of Leg Ulcers on Quality of Life-Financial, Social and Psychological Implications. *J Am Acad Dermatol.* 1994;31:49-53.
9. Gilliland EL, John HN. ABC of vascular diseases: Leg ulcers. *Br Med J.* 2012;303:776-9.
10. Burton CS. Treatment of Leg Ulcers. *Dermatol Clin.* 1993;11:315-23.
11. Dale JJ, Callam MJ, Ruckley CV, Harper DR, Berrey PN. Chronic Ulcers of the Leg: Clinical History. *Br Med J.* 1987;294:1389-91.
12. Forssgren A, Nelzén O. Changes in the aetiological spectrum of leg ulcers after a broad-scale intervention in a defined geographical population in Sweden. *Eur J Vasc Endovasc Surg.* 2012;44(5):498-503.
13. Kumar AS, Binitha MP, Sarita S. A clinical and aetiological study of chronic leg ulcers. *Int J Contemporary Med Res.* 2016;3(12):3438-40.

**Cite this article as:** Kuntoji SB, Guduru PK. Clinical and aetiological study of chronic lower limb ulcers. *Int Surg J* 2021;8:1839-43.